Demographics of colorectal cancer in Jordan: A retrospective statistical study from a major tertiary hospital

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ABSTRACT

Objective: To assess the demographics of colorectal cancer patients at the King Hussein Medical Center (KHMC) with regard to age, sex, location of primary tumor, and the stage of the tumor.

Methods: A total number of 278 patients were diagnosed with colorectal cancer in the colorectal unit at KHMC over the period from December 2017 to June 2020. Patient's records were reviewed, and their demographic data were collected such as age, sex, site of tumor, and tumor stage. SPSS version 24 was used to statistically analyze the data.

Results: The mean age of patients was 58 years. The incidence showed a positive relationship with age, with the highest incidence being in the seventh decade. The male to female ratio was 1.59:1. The most common tumor site was the left colon (40%), followed by the right colon (35%) and then the rectum (24%). Most tumors (39.2%) were at stage III at the time of diagnosis, while stage IV tumors were seen in 25.5% of patients, stage II tumors also in 25.5%, and stage I in 4%, Stage 0 tumors were only documented in 1.5% of patients.

Conclusion: Our statistical retrospective results showed a similar pattern with the data from international studies regarding gender distribution and location of tumor, but out patients were more likely to present at younger age and later stages than patients in most other parts of the world, these findings reflect poor adherence to various screening programs. Therefore, improvements in screening protocols and diagnostic tools, as well as enhancing public awareness, might change this distribution, improving the quality of life of colorectal cancer patients and the economic burden for health-related services.

Key words: Colorectal cancer, demographics, stage, Jordan, screening

INTRODUCTION

Colorectal cancer (CRC) is the third most common malignancy in the world and the second most common cause of death in cancer patients.[1, 2] The incidence and mortality of CRC varies widely, with about two thirds of cases occurring in countries with a high human development index.[3] Variation in the incidence of CRC is also evident between different races, also residency has an effect on incidence, which supports the involvement of environmental factors.[4] CRC is more common in countries with westernized lifestyle practices and has recently been rising steadily in developing countries.[5, 6] Lifestyle factors, which include diet, physical activity, alcohol consuming, and tobacco use, may contribute to an increased risk of getting the disease. These are modifiable risk factors that can be avoided by increasing physical activities, having a healthy fiber-rich diet, and avoiding red meat, processed food, alcohol intake, and smoking. Non-modifiable risk factors include family or personal history, inflammatory bowel disease, and age. For these factors, the risk of CRC can be reduced by screening for the early detection of cancer.[7].

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The median age at diagnosis is 66 years in men and 69 years in women, which means that CRC has increased in younger patients in the last 20 years.[8]

Screening can decrease the incidence rate of CRC, through the removal of precancerous growths, and decreases mortality by the early detection and removal of cancer. Screening methods include colonoscopy, computed tomographic colonography, flexible sigmoidoscopy, and stool tests.[8, 9]

The treatment of CRC depends on many factors, including overall patient health and the site and size of the tumor. Surgery is the main treatment option, with the type of surgery depending on the tumor site and the presence of metastasis. Once tumors are beyond surgery, treatment can include chemotherapy, targeted therapy, radiotherapy, and cryosurgery.[10]

In Jordan, CRC is the second most common cancer in both men and women. In 2020, a total of 1,260 new cases of CRC were reported by the Globocan Agency.[11]

The present study analyzes the demographic data of CRC patients at the King Hussein Medical Center (KHMC).

PATIENTS AND METHODS

This is a retrospective statistical analytical study, conducted at KHMC (a major tertiary hospital in Jordan), and included two hundred seventy-eight patients who were diagnosed with CRC in the colorectal unit over the period from December 2017 to June 2020. Benign cases that were diagnosed after surgery were excluded from study. We reviewed the hospital records for all patients and collected the following data from their medical files: age, gender, site of tumor, stage of the tumor, and presence of metastasis at the time of diagnosis. The tumor site was classified as a right colon tumor for those arising from the cecum, ascending colon, hepatic flexure, and transverse colon; a left colon tumor for tumors arising from the splenic flexure, descending colon, and sigmoid colon; and a rectal tumor where the tumor originated from the rectum. Post-operative staging was performed on histopathologic specimens and designated from stage 0 to stage IV, according to the TNM staging system (AJCC Cancer Staging Manual, Eighth Edition, 2017)[12].

Data were statistically analyzed using SPSS version 24. We used the *p* value as a measure of significance with alpha level of <0.05. A chi-square test of independence was performed to examine the relation between variables. The categorical data were reported as frequency and percentages.

Ethical committee approval was obtained prior to this study being conducted (No.4. 7/2021).

RESULTS

The age range for our patients was between twenty and ninety-six years. There was a male preponderance, with 171 male patients (61.5%) with an average age of 61.8 years and median 63 years, and 107 female patients (38.5%) with an average age of 61.7 years and median 64 years. The most common tumor location in our patients was the left colon with 110 cases (40%), followed by the right colon, with 97 cases (35%) and then the rectum with 67 cases (24%). There were 4 cases (1%) in which the tumor was synchronous in multiple sites of the colon. Seventy-four patients (26.6%) had distant metastasis at the time of diagnosis. The most common site of metastasis was the liver, being

isolated metastasis in 59% and combined with lung metastasis in 18%, followed by isolated lung metastasis in 4%, while other sites of distant metastasis (such as the peritoneum, kidney, adrenals, bone, ovaries, and omentum) were evident in 14 patients, representing 19% of metastasis. Our analysis did not show a significant association between the site of the tumor and the incidence of metastasis, with a p-value of 0.8 (Table 6)

The incidence of CRC increased with age, with a peak in the seventh decade of life. The age distribution was a little younger in females (Figure 1). The youngest patient was 20 years old, and 13 patients (4.7%) were less than 40 years of age; the correlation between gender and age in CRC patients was statistically insignificant with a p value of 0.9.

On evaluation of CRC distribution according to gender, we found that the most common tumor site in women was the rectum (36%), followed by the right colon (34%), and the least common site was the left colon, with a percentage of 30. In men, the tumor distribution was totally different, with the most common location being the left colon (46%), followed by the right colon (37%) and then the rectum (17%) (Figure 2). Statistical analysis showed a significant relationship between gender and the site of the tumor, a chi-square test of independence showed that there was a significant relation between gender and site of tumor with p-value of 0.001.

Staging was carried out post-operatively according to the American Joint Committee of Cancer. Around 39.2% of the patients had CRC stage III at diagnosis, while 25.5% had stage IV, the same percentage of 25.5% had stage II, four percent had stage I, and only 1.5% had stage 0 at time of diagnosis with. Patients with no staging counted 4.3%. Women showed a slight trend toward the earlier stages than men (Figure 3). Nevertheless, our statistical analysis showed no significant relationship between the stage of CRC and gender, with p-value of 0.09.

Table I. Demographics of patients with colorectal cancer in this study

Parameter	No. of patients N=278	Percentage
Sex	Mean age	
58		
Male	171	61.5
Female	107	38.5
Location of tumor		
Right colon	97	35
Left colon	110	40
Rectum	67	24
Multiple sites	4	1
Stage		
0	4	1.5
I	11	4
II	71	25.5
III	109	39.2
IV	71	25.5
No staging	12	4.3

Figure I. Distribution of colorectal cancer according to age
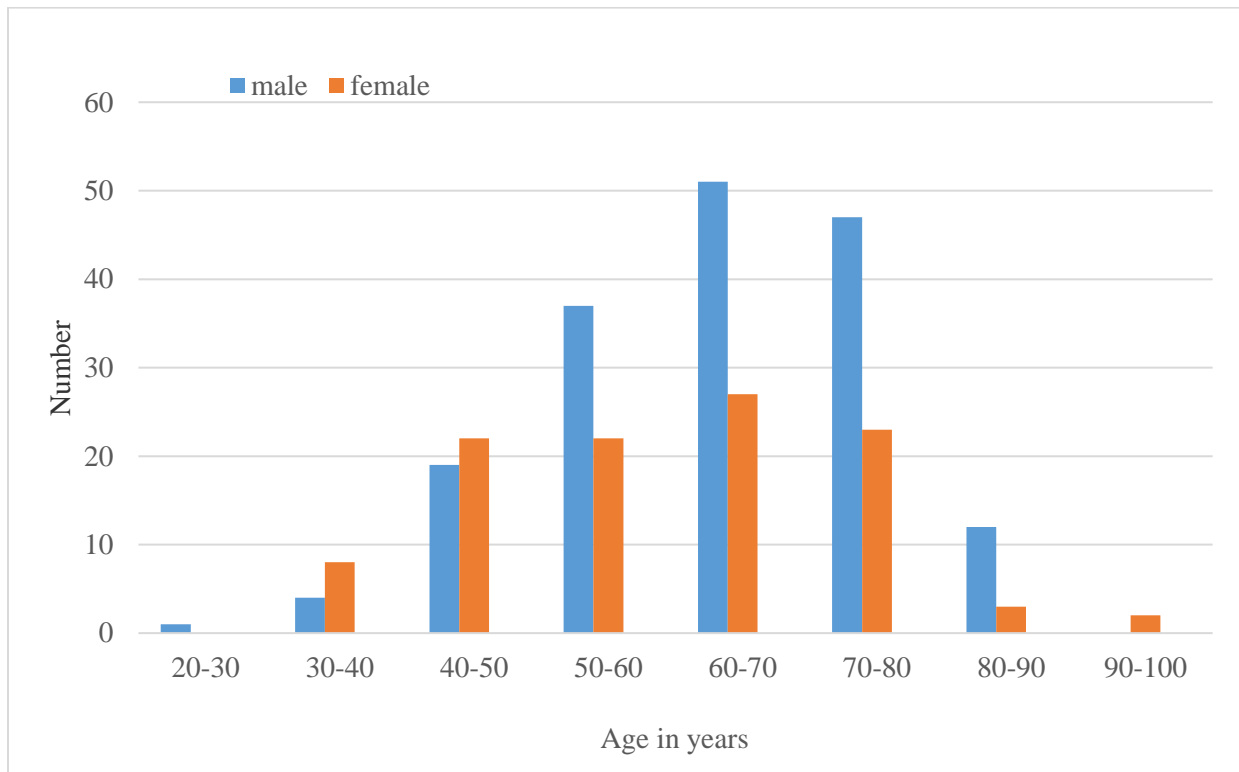
Table II. Association between gender and age in CRC patients

Variable	Age range in years N= 278 n (%)							N (%)	Chi square	p value
	20-30	30-40	40-50	50-60	60-70	70-80	>80			
Gender									10.695	0.098
Male	1 (0.6)	4 (2.3)	19 (11.2)	37 (21.6)	51 (29.8)	47 (27.5)	12 (7)	171 (61.5)		
Female	0	8 (7.5)	22 (20.6)	22 (20.6)	27 (25.2)	23 (21.5)	5 (4.6)	107 (38.5)		
N (%)	1 (0.4)	12 (4.3)	41 (14.7)	59 (21.2)	78 (28.1)	70 (25.2)	17 (6.1)	278		

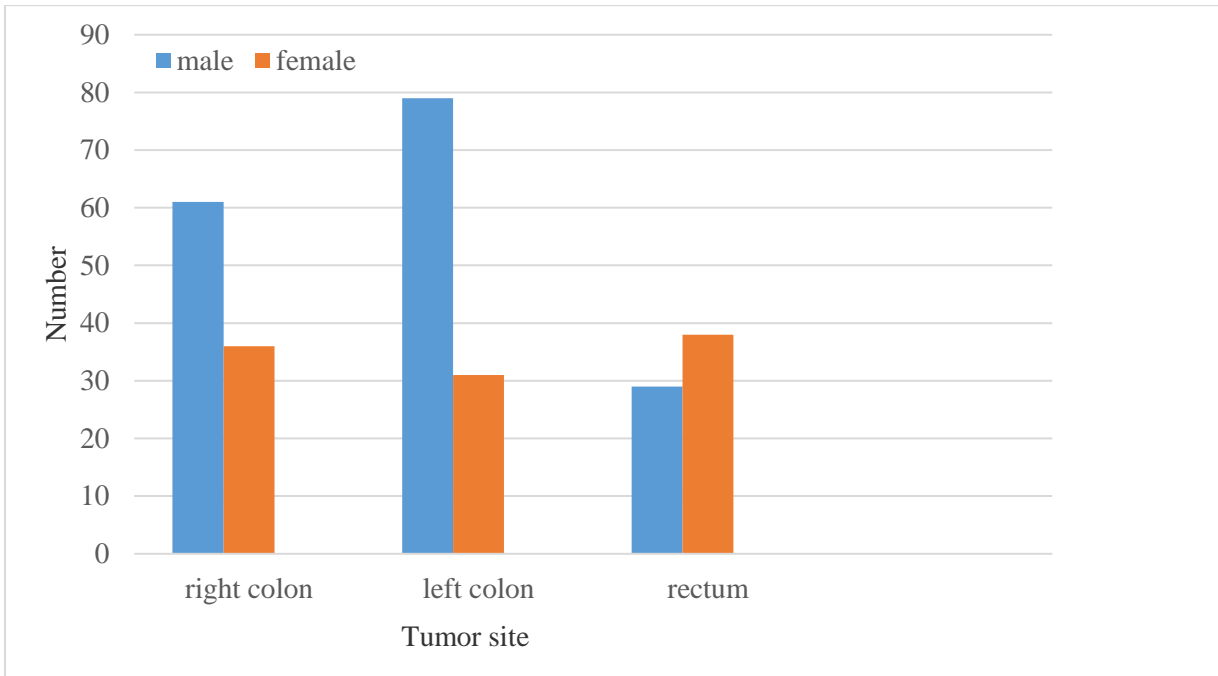**Figure 2**. Distribution of colorectal cancer location

Table III. Association between gender and site of tumor in CRC patients

Variable	Site of tumor N= 274 n (%)			N (%)	Chi square	p value
	Right colon	Left colon	Rectosigmoid			
Gender					14.4364	0.001
Male	61 (36.1)	79 (46.7)	29 (17.2)	169 (61.7)		
Female	36 (34.3)	31 (29.5)	38 (36.2)	105 (38.3)		
N (%)	97 (35.4)	110 (40.1)	67 (24.5)	274		

Figure III. Distribution of colorectal cancer stage at time of diagnosis
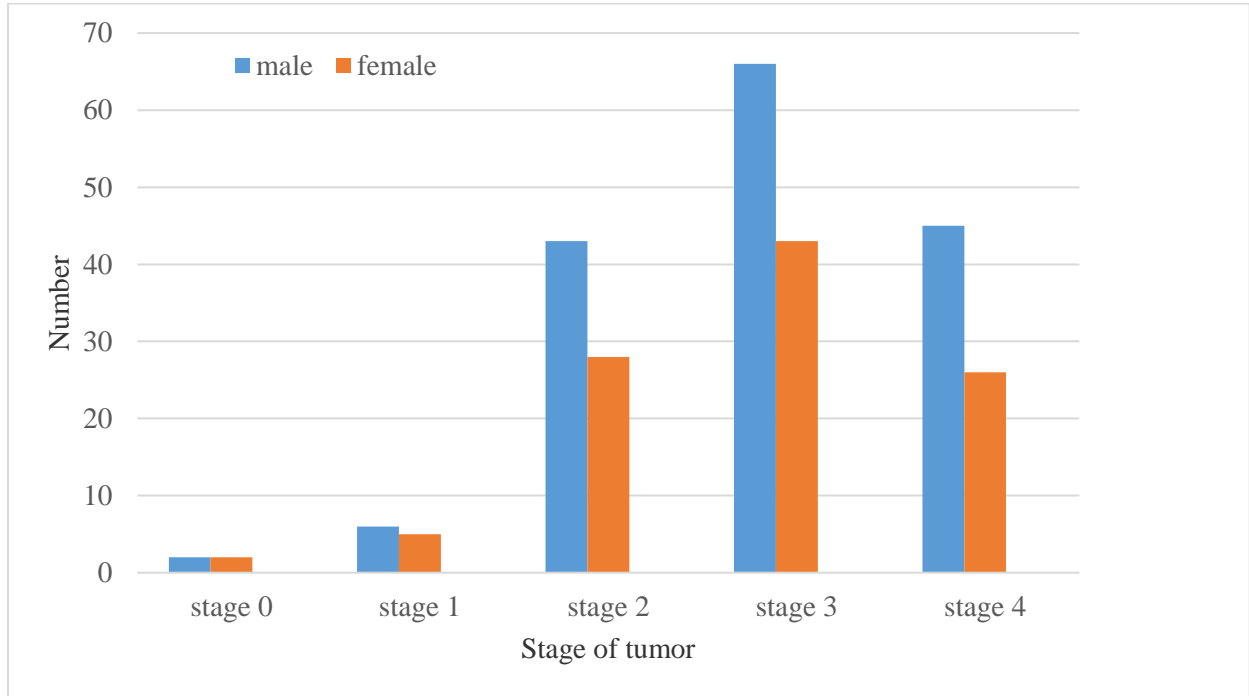
Table IV. Association between gender and stage of tumor

Variable	Stage N= 266 n (%)					N (%)	Chi square	p value
	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4			
Gender							0.5785	0.965
Male	2 (1.2)	6 (3.7)	43 (26.5)	66 (40.8)	45 (27.8)	162 (61)		
Female	2 (1.9)	5 (4.8)	28 (26.9)	43 (41.3)	26 (25.1)	104 (39)		
N (%)	4 (1.5)	11 (4.1)	71 (26.7)	109 (41)	71 (26.7)	266		

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Figure IV. Stages of tumor in age groups
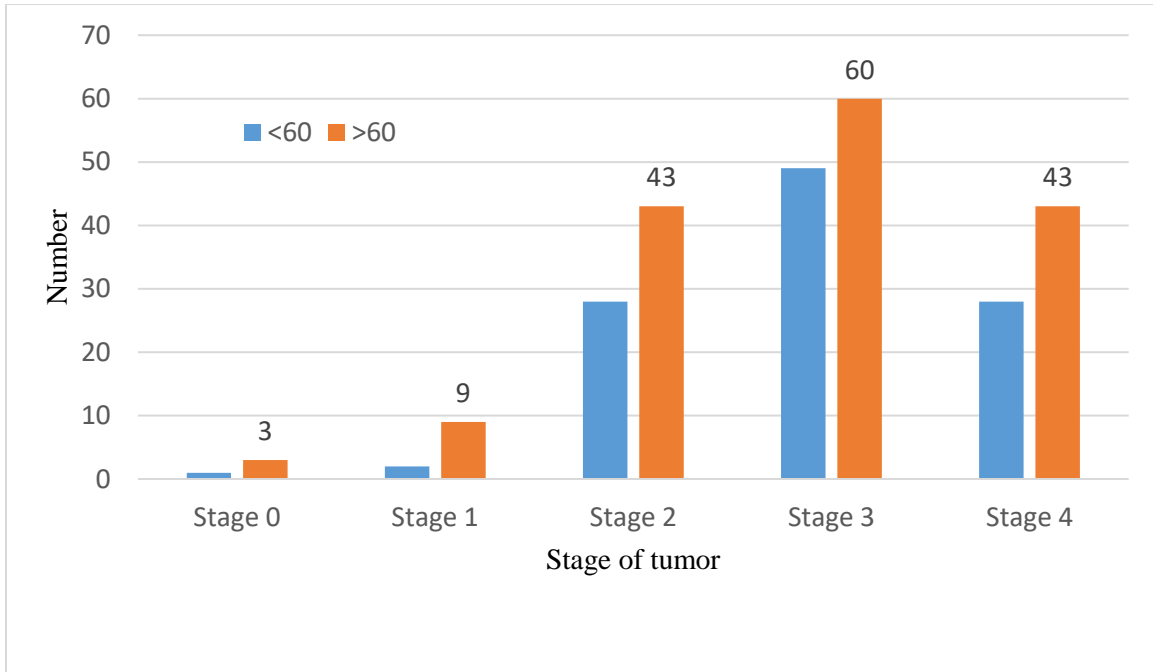
Table V. Association between stage of tumor and age

Variable	Stage N=266 n (%)					N (%)	Chi square	p value
	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4			
Age							3.6325	0.458
<60 years	1 (0.9)	2 (1.9)	28 (25.9)	49 (45.4)	28 (25.9)	108 (40.6)		
>60 years	3 (1.9)	9 (5.7)	43 (27.2)	60 (38)	43 (27.2)	158 (59.4)		
N (%)	4 (1.5)	11 (4.1)	71 (26.7)	109 (41)	71 (26.7)	266		

Table VI. Association between site of tumor and the incidence of metastasis

Variable	Site of Tumor N=274 n (%)			N (%)	Chi square	p value
	Right colon	Left colon	Rectosigmoid			
Presence of Mets					0.3143	0.854
Metastasis	24 (32.9)	31 (42.4)	18 (24.7)	73 (26.6)		
No metastasis	73 (36.3)	79 (39.3)	49 (24.4)	201 (73.4)		
N (%)	97 (35.5)	110 (40)	67 (24.5)	274		

DISCUSSIONS

In this study we have investigated the demographics of CRC in Jordan which showed younger age presentation. This finding necessitates the implementation of screening program for CRC in Jordan.

Cancer in Jordan has steadily increased in the last two decades.[13] On a collective basis, the most frequent cancers in both genders are breast, colorectal, lymphoma, lung, and leukemia.[14] In Western Asia, Jordan is considered as one of the countries with the highest incidence of CRC, along with Lebanon and Turkey, due to an increased prevalence of obesity, unhealthy dietary habits, decreased physical activities, a sedentary lifestyle, and smoking.[15]

CRC in Jordan ranks second in the list of cancers in both genders.[11, 14] Our study showed that the highest incidence is in the group aged 60-70 years, which is in accordance with a previous study in Jordan in 1997 and with other studies in the literature.[16, 17, 18] The mean age of our patients was 58 years, which is lower than that reported in western countries and could be explained by the younger age of the Jordanian population.[17, 18, 19] It has been reported that younger age at diagnosis is associated with a more advanced stage, which is in parallel with this study, where the percentage of patients younger than 60 years with late stage (III & IV) CRC was 71%, while that for patients older than 60 was 63%.[20]

The left colon was the most frequent site for CRC in our patients, which is in agreement with Fazeli et al. (2007) but in disagreement with Griffith et al. (2021).[21, 22] Regarding the gender of patients, there was a male predominance of 61.5%, as reported in most other studies.[8, 16, 21, 23] The distribution of the CRC tumor location differed between men and women, with a predominance of the left colon in men and the right colon in women, which is in accordance with the literature.[24, 25] Right colon tumors are usually associated with a late presentation, more aggressive behavior and a higher mortality than other tumor sites.[26] Both genders showed similar percentages of stage IV CRC, with 24% in females and 26% in males, which is against expectation, because women are more likely to have a right colon tumor, which tends to present in an advanced stage at the time of diagnosis.[24]

The median age at diagnosis is 63.5 years for right CRC and 64 years for left colon and rectal tumors, which is a little different from the data reported by Kim SE et al. (2015) and other studies in the literature, where the age of patients increased in association with a shift in the anatomical site of origin of the CRC from the left colon to the right colon.[24, 25, 26]

The majority of the patients in this study presented in advanced stages III and IV (38.8% and 25.5%, respectively), which means that most patients present late with symptoms, reflecting poor adherence to screening protocols. These findings were in agreement with a study conducted in the Caribbean Island of Barbados on 97 CRC patients.[22]
The liver was the most common site for metastasis, followed by the lung and peritoneum. Other sites of metastasis were bone, ovaries, kidneys, adrenals, spleen, and brain. We did not notice a difference in the sites of metastasis between the right and left colon, which is inconsistent with Engstrand et al. (2018) who reported that liver metastasis was more frequent in left CRC.[27]

Conclusion

Our statistical retrospective results showed a similar pattern with the data from international studies regarding gender distribution and location of tumor, but out patients were more likely to present at younger age and later stages than patients in most other parts of the world, these findings reflect poor adherence to various screening programs. Therefore, improvements in screening protocols and diagnostic tools, as well as enhancing public awareness, might change this distribution, improving the quality of life of colorectal cancer patients and the economic burden for health-related services.

Limitations of the study
The main limitation in this study is that some data are missing because of loss of follow up of some patients in Royal Medical Services hospitals.

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